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PRIME DATABASE
DATA DOCUMENTATION INDEX

PARENT

Introduction

The database data documentation is structured as a series of documents. Generally, these documents cover the data from one or more database data tables. Occasionally, a table is covered by more than one document where it contains data that map to similar data structures but are generically different.

CTD Profiles (Table BINCTD)
Vertical profiles of temperature, salinity, dissolved oxygen, chlorophyll, optical attenuance and light channels.

Water Bottle Data (Table BOTDATA)
A wide range of physical, chemical and biological parameters measured on discrete water samples collected using bottles and pumps (shipboard and *in situ*).

Net Haul Data (Table NETDATA)
Chlorophyll concentrations and a wide range of zooplankton size-fractions, species and developmental stage abundance and biomass data.

Production Data (Table N15DAT)
Data from long (24-hour) in-situ and on-deck production experiments.

Particle Counts (Table MULTI)
Particle surface area, volume and abundance data for over 200 size classes.

Fatty Acids (Table FATACID)
Concentrations and $\delta^{13}C$ ratios of different fatty acid classes, analysed from particulates and microzooplankton samples from the cruise and mesocosm experiment.

Secchi Disk Deployments (table SECCHI)
Secchi disk depths and associated wind and sea state observations recorded during cruises to Ocean Weather Station India in the early 1970's.

Weather Observations (Table WEATHER)
Measurements made of air temperature, cloud cover, precipitation and wind speed at Bergen airport during the period of the mesocosm experiment.

ARGOS Buoy Data (Table ARGOS)
Position updates obtained from four drifting buoys positioned to delimit the area of the Lagrangian Study.

Production Data

Introduction

The production data tables hold the results of uptake experiments that cannot sensibly be mapped into the water bottle data table (BOTDATA) because the amount of supporting information required exceeds what can be included in an 8-byte parameter code. The protocol of these experiments are given below.

Dr. Andrew Rees and Dr. Kirsten Donald

Samples were collected from up to eight depths between the surface and 1% light depth, using pre-dawn CTD casts. They were then 'spiked' with the stable isotope ^{15}N to give a final concentration of 10% ambient nitrate or ammonia.

Light and dark incubations were for 24 hours - either on-deck or *in situ*. Incubations on deck were undertaken with sealed polyethylene blue filters to simulate the *in situ* light environment. *In situ* incubations were undertaken by attaching the bottle to a free-floating rig which was deployed prior to sunrise, recovered at sunset and then placed in darkness until dawn (0600). Incubations were terminated by filtration onto ashed GF/F filters, which were then stored frozen prior to transfer to PML for processing. Analysis was by mass spectrometry.

Particle Size Data

Introduction

The MULTISIZER contains size distribution data that cannot easily be incorporated into the table BOTDATA due to the large number (>250) of channels, each representing a different size fraction.

Lesley Freedman

Five samples were taken from each bag of the mesocosm experiment on a daily basis. The five samples were counted and the counts averaged. The diameter of cells passing through each of 256 channels was determined by a Coulter Multisizer Accucomp. A background count was also determined using ISOTON; this was then deducted from all bag/day counts. The following settings were used on the Multisizer.

Orifice Diameter	140um
Orifice Length	105um
Setup	Manual
Analysis	Full
Calibration	Recall
Kd	1307.5
Size	13.5E
Size units	um
Current + gain	Manual
Aperture Current	1600uA
Gain	2
Polarity	+
Control	Siphon
Time	0 seconds
Channel Count	64000
Total Count	640E4
Channels	256
Autoscaling	On
Edit	On
Coincidence Corr	On
Analytical Volume	2000ul
Particle Relative Density	1.0
Diff Values	Absolute
End Tone	On

Data Quality

No counts were recorded in the first (smallest) channels for any of the samples collected; these channels have therefore been deleted from the database. It is possible that all abundances, surface areas and volumes recorded in channels 235 and above are significant overestimates and as such should be treated with caution.

References

Coulter Electronics Limited. Coulter Fine Particle Application Notes. Instruction manual 9900266-E.

Coulter Electronics Limited Coulter Multisizer II. Reference Manual 9912433-C

Coulter Electronics Limited. Coulter Multisizer AccuComp Color Software Reference Manual PN 4235890 (1989). Corporate Communications

Sheldon R.W. and Parsons T.R. (1967) A Practical Manual on the use of the Coulter Counter in Marine Research. Coulter Electronic Sales Company, Canada.

Fatty Acid Data

Introduction
The table FATACID contains information on the relative proportions and d13C rations of a number of saturated, monounsaturated and polyunsaturated fatty acids.

Dr. David Pond

Water samples were taken from the CTD rosette and filtered through Whatman GF/C filters. The filtrate was poisoned with mercuric chloride and stored in glass and polythene bottles in a cooling chamber until analysed. The filters were stored at -17 °C until analysed as follows for a range of fatty acids. All solvents were of analytical grade and re-distilled in all-glass apparatus before use. Glass fibre thimbles were heated at 550 °C in a muffle furnace overnight. All glassware was rinsed with organic solvent before use. The samples were Soxhlet-extracted in a glass fibre thimble. Water content was reduced by repeated mixing with methanol, settling and extraction of the super-natant into the extraction flask. The samples were Soxhlet-extracted by chloroform/ methanol/ water azeotrope (42:7:1 v:v:v) under nitrogen within 16 hours. Fatty acid methyl ester (FAME) was added to the sample as an internal standard prior to extraction.

The extracts were rotary-evaporated, transferred into 10-ml Sovirel tubes and evaporated to dryness. 2 ml of 2% sulphuric acid in dry methanol and 0.2 ml of toluene were added and the lipids trans-methylated under argon at 80 °C for 12 hours. The reaction mixture was diluted with 1 ml of double-distilled water and extracted with hexane three times. The organic phases were combined and evaporated to dryness. The FAME components were isolated from the extracts by thin-layer chromatography on silica gel plates with n-hexane-diethylether-acetic acid (90:10:1 v:v:v) as mobile phase. FAME were recovered by scraping a 3-cm band from the 4-8 cm region (detected by a reference mixture developed on each plate) and eluted with 5 ml of dichloromethane. GC analysis was performed using a Hewlett-Packard 5710A gas chromatograph, employing a 50 m by 0.3mm internal diameter Silar 10C WCOT glass capillary column with helium carrier gas (0.8 bar), split 1:10, temperature programmed from 120 °C to 220 °C at 4 °C per minute and held at 220 °C for 20 minutes. Quantification was done via the internal standard with a Merck-Hitachi D2000 integrator, Fatty acid contamination throughout the procedure, as detected by blank analyses, was negligible. Deviation in total fatty acid content was below 2% in duplicate analyses. FAME components were identified from former results, electron-impact mass spectrometric analyses and ammonia chemical-ionisation mass spectrometry. Double bond location was performed with the 2-amino-2-methylpropanol derivatives of polyunsaturated fatty acids and dimethyl-disulphide derivatives of monounsaturated FAME. Unsaturated and polyunsaturated FAME were separated from the saturated FAME by argentation chromatography.

Secchi Disk Deployments

A Secchi disk is (usually) a 20cm diameter disk painted black and white in contrasting quarters. A calibrated line hangs from a ring in the centre of the disk so that it hangs horizontally in seawater. During the many cruises to Ocean Weather Station India in the early 1970's, the disks were lowered into the seawater until they became invisible. The depth at which they first became invisible was recorded and the process was repeated. The Secchi disk depth given is the average of two recordings. Observations were also made of cloud cover, wind speed (estimated from the sea state) and the sea state according to the Beaufort Scale.

Weather Observations

During the mesocosm experiment, measurements were made of air temperature, wind speed, precipitation and cloud cover at the local airport. These measurements were either made four times a day (at midnight, 06:00, noon and 18:00) or twice daily (06:00 and 18:00).

ARGOS Buoy Data

The three ARGOS buoys and GPS buoy (drogued at 14m) were deployed during the PRIME cruise after an extensive SeaSoar survey, based partially on the results of satellite imagery had defined a strong anticyclonic circulation (eddy).

On June 17th 1996 an ARGOS buoy was deployed some 10km west of the defined eddy centre at 59.367 North, 20.433 West. Station work was undertaken at the eddy centre during which, considerable ship drift of the order of 50 cm per second shifted the notional centre of the eddy 3.5km to the West.

On 18th June 1996, two ARGOS buoy and a GPS buoy were deployed in an equidistant (1km spacing) triangular array centred on the focus of the eddy.

The positions of all four buoys were obtained by satellite fixes until all four buoys were successfully recovered at the end of the first leg of the cruise.

One of the ARGOS buoys was later redeployed at 37 North 19 West so that station work could be conducted at this site under semi-Lagrangian conditions.